Amendments to the Claims:

Please cancel claims 1 – 102 and replace with new claims 103 - 176:

1. (cancelled) A composite core for an aluminum conductor composite core reinforced cable comprising:

   two or more longitudinally oriented and substantially continuous reinforced fiber types in a thermosetting resin matrix, said core having at least 50% fiber volume fraction and an operating capability in the range of about 90 to about 230 °C.

2. (cancelled) A composite core as set forth in claim 1 wherein the reinforced fiber types of the composite core are selected from the group consisting of carbon, Kevlar, basalt, glass, aramid, boron, liquid crystal fibers, high performance polyethylene and carbon nanofibers.

3. (cancelled) A composite core as set forth in claim 1 comprising a thermosetting resin having a neat resin fracture toughness at least about 0.87 INS-lb/in.

4. (cancelled) A composite core as set forth in claim 1 comprising a thermosetting resin having a tensile strength at least about 160 to about 240 Ksi.

5. (cancelled) A composite core as set forth in claim 1 comprising a thermosetting resin having the ability to withstand operating temperatures in the range of about 90 to about 230 °C.

6. (cancelled) A composite core as set forth in claim 1 wherein at least one reinforced fiber type comprises a modulus of elasticity in the range of about 22 to 37 Msi coupled with a coefficient of thermal expansion in the range of about -0.7 to about 0 m/m/C.

7. (cancelled) A composite core as set forth in claim 1 wherein at least one reinforced fiber type comprises a modulus of elasticity in the range of about 6 to about 7 Msi coupled with a coefficient of thermal expansion in the range of about 5×10^{-6} to about 10×10^{-6} m/m/C.

8. (cancelled) A composite core as set forth in claim 1 comprising a fiber/resin volume fraction in the range of about 50 to about 57%.

9. (cancelled) A composite core as set forth in claim 1 comprising a fiber/resin ratio in the range of about 62 to about 75% by weight.

10. (cancelled) A composite core as set forth in claim 1 comprising an ambient temperature capability in the range of about –40 to about 90 C.

11. (cancelled) A composite core as set forth in claim 1 wherein said composite core comprises a hybridized concentric core having an inner carbon/epoxy layer and an outer glass fiber/epoxy layer.

12. (cancelled) A composite core for an aluminum conductor composite core reinforced cable comprising:

    at least one longitudinally oriented and substantially continuous reinforced fiber type in a thermosetting resin matrix, said core having at least 50% fiber volume fraction, an operating capability in the range of about 90 to about 230 C, a modulus of elasticity in the range of about 22 to 37 Msi, a coefficient of thermal expansion in the range of about –0.7 to about 0 m/m/C and a tensile strength in the range of about 160 to about 240 Ksi.

13. (cancelled) A composite core as set forth in claim 12 wherein the reinforced fiber of the composite core is selected from the group consisting of carbon, Kevlar, basalt, glass, aramid, boron, liquid crystal fibers, high performance polyethylene and carbon nanofibers.

14. (cancelled) A composite core as set forth in claim 12 comprising a thermosetting resin having a neat resin fracture toughness at least about 0.87 INS-lb/in.

15. (cancelled) A composite core as set forth in claim 12 comprising a thermosetting resin having a tensile strength at least about 160 to about 240 Ksi.

16. (cancelled) A composite core as set forth in claim 12 comprising a thermosetting resin having the ability to withstand ambient temperatures in the range of about –40 to about 90 C.

17. (cancelled) A composite core as set forth in claim 12 comprising a fiber/resin volume fraction in the range of about 50 to about 57%.

18. (cancelled) A composite core as set forth in claim 12 comprising a fiber/resin ratio in the range of about 62 to about 75% by weight.

19. (cancelled) A composite core as set forth in claim 12 comprising an operating temperature capability in the range of about 170 to about 220 C.

20. (cancelled) A composite core as set forth in Claim 12 comprising an ambient temperature capability in the range of about –40 to about 90C.

21. (cancelled) A composite core as set forth in claim 12 wherein the core comprises two or more longitudinally oriented and substantially continuous reinforced fiber types in a thermosetting resin matrix.

22. (cancelled) A composite core as set forth in claim 12 wherein said composite core comprises a hybridized concentric core having an inner carbon/epoxy layer and an outer glass fiber/epoxy layer.

23. (cancelled) A composite core for an aluminum conductor composite core reinforced cable comprising:

    an inner core comprising an advanced composite; and

    an outer core comprising a low modulus composite.

24. (cancelled) A composite core as set forth in claim 23 wherein said inner and outer layers form a uniform concentric hybridized core.

25. (cancelled) A composite core as set forth in claim 23 having a total fiber volume fraction in the range of about 50 to about 57%.

26. (cancelled) A composite core as set forth in claim 23 having a total fiber/thermosetting resin ratio in the range of about 62 to about 75% by weight.

27. (cancelled) A composite core as set forth in claim 23 wherein the core comprises a tensile strength in the range of about 160 to about 240 Ksi, a modulus of elasticity in the range of about 7 to about 30 Msi, an operating temperature in the range of about 90 to about 230 C and a thermal expansion coefficient in the range of about 0 to about 6×10^{-6} m/m/C.

28. (cancelled) A composite core as set forth in claim 23 wherein the physical characteristics of said outer layer accommodates splicing.

29. (cancelled) A composite core as set forth in claim 23 wherein said composite core comprises a hybridized concentric core having an inner carbon/epoxy layer and an outer glass fiber/epoxy layer.

30. (cancelled) A composite core as set forth in claim 23 wherein the core comprises a tensile strength in the range of about 160 to about 240 Ksi.

31. (cancelled) A composite core as set forth in claim 23 wherein the core comprises a modulus of elasticity in the range of about 7 to about 30 Msi.

32. (cancelled) A composite core as set forth in claim 23 wherein the core comprises an operating temperature in the range of about 90 to about 230 C.

33. (cancelled) A composite core as set forth in claim 23 wherein the core comprises a thermal expansion coefficient in the range of about 0 to about 6 x 10^{-6} m/m/C.

34. (cancelled) A composite core for an aluminum conductor composite core reinforced cable comprising:

An inner core comprising a carbon/epoxy composite; and

An outer core comprising a glass fiber/epoxy composite.

35. (cancelled) A composite core as set forth in claim 34 wherein said inner and outer layers form a uniform concentric hybridized core.

36. (cancelled) A composite core as set forth in claim 34 wherein said inner and outer layers form a segmented concentric core.

37. (cancelled) A composite core as set forth in claim 34 having a total fiber fraction volume in the range of about 50 to about 57%.

38. (cancelled) A composite core as set forth in claim 34 having a fiber/resin ratio in the range of about 62 to 75% by weight.

39. (cancelled) A composite core as set forth in claim 34 wherein the core comprises a tensile strength in the range of about 160 to about 240 Ksi, a modulus of elasticity in the range of about 7 to about 30 Msi, an operating temperature in the range of about 90 to about 230 C and a thermal expansion coefficient in the range of about 0 to about 6 x 10^{-6} m/m/C.

40. (cancelled) A composite core as set forth in claim 34 wherein the core comprises a tensile strength in the range of about 160 to about 240 Ksi.

41. (cancelled) A composite core as set forth in claim 34 wherein the core comprises a modulus of elasticity in the range of about 7 to about 30 Msi.

42. (cancelled) A composite core as set forth in claim 34 wherein the core comprises an operating temperature in the range of about 90 to about 230 C.

43. (cancelled) A composite core as set forth in claim 34 wherein the core comprises a thermal expansion coefficient in the range of about 0 to about 6 x 10^{-6} m/m/C.

44. (cancelled) A composite core as set forth in claim 34 wherein the physical characteristics of said outer layer accommodates splicing.

45. (cancelled) An aluminum conductor composite core reinforced cable comprising:

a composite core having at least one longitudinally oriented and substantially continuous reinforced fiber type in a thermosetting resin matrix, said core having at least 50% fiber volume fraction, an operating temperature capability in the range of about 90 to about 230 C; a tensile strength in the range of about 160 to about 240 Ksi, a modulus of elasticity in the range of about 7 to about 30 Msi and a thermal expansion coefficient in the range of about 0 to about 6 x 10-6 m/m/C; and

at least one layer of aluminum conductor surrounding the composite core.

46. (cancelled) A cable as set forth in claim 45 wherein said at least one layer of aluminum surrounding the composite core comprises a plurality of trapezoidal shaped aluminum segments wrapped around the core.

47. (cancelled) A cable as set forth in claim 45 wherein a second layer of a plurality of trapezoidal shaped aluminum segments is wrapped around the core.

48. (cancelled) A composite core as set forth in claim 45 wherein the composite core comprises two or more longitudinally oriented and substantially continuous reinforced fiber types.

49. (cancelled) A composite core as set forth in claim 45 wherein the composite core permits splicing.

50. (cancelled) A composite core as set forth in claim 45 comprising a fiber/resin volume fraction in the range of about 50 to about 57%.

51. (cancelled) A composite core as set forth in claim 45 comprising a fiber/resin ratio in the range of about 62 to about 75% by weight.

52. (cancelled) A cable of claim 45 wherein the reinforced fiber types of the composite core are selected from the group consisting of carbon, Kevlar, basalt, glass, aramid, boron, liquid crystal fibers, high performance polyethylene and carbon nanofibers.

53. (cancelled) A composite core as set forth in claim 45 wherein said composite core comprises a hybridized concentric core having an inner carbon/epoxy layer and an outer glass fiber/epoxy layer.

54. (cancelled) An aluminum conductor composite core reinforced cable comprising:

a composite core having two or more longitudinally oriented and substantially continuous reinforced fiber types in a thermosetting resin matrix, said core having at least 50% fiber volume fraction and an operating capability in the range of about 90 to about 230 C; and

at least one layer of aluminum conductor surrounding the composite core.

55. (cancelled) A composite core as set forth in claim 53 having a tensile strength in the range of about 160 to 240 Ksi.

56. (cancelled) A composite core as set forth in claim 53 having a modulus of elasticity in the range of about 7 to 30 Msi.

57. (cancelled) A composite core as set forth in claim 53 having a thermal expansion coefficient range of about 0 to 6 x 10^{-6} m/m/C.

58. (cancelled) A cable as set forth in claim 53 wherein said at least one layer of aluminum surrounding the composite core comprises a plurality of trapezoidal shaped aluminum segments wrapped around the core.

59. (cancelled) A cable as set forth in claim 53 wherein a second layer of a plurality of trapezoidal shaped aluminum segments is wrapped around the core.

60. (cancelled) A cable as set forth in claim 53 wherein the composite core permits splicing.

61. (cancelled) A composite core as set forth in claim 53 comprising a fiber/resin volume fraction in the range of about 50 to 57%.

62. (cancelled) A composite core as set forth in claim 53 comprising a fiber/resin ratio in the range of about 62 to 75% by weight.

63. (cancelled) A composite core as set forth in claim 53 wherein the fibers of the composite core are selected from the group consisting of carbon, Kevlar, basalt, glass, aramid, boron, liquid crystal fibers, high performance polyethylene and carbon nanofibers.

64. (cancelled) A composite core as set forth in claim 53 wherein said composite core comprises a hybridized concentric core having an inner carbon/epoxy layer and an outer glass fiber/epoxy layer.

65. (cancelled) An aluminum conductor composite core reinforced cable comprising:

a carbon/epoxy inner core;

a glassfiber/epoxy outer core; and

at least one layer of aluminum conductor surround the composite core.

66. (cancelled) A composite core as set forth in claim 64 wherein said inner core comprises a tensile strength at least about 370 Ksi, a tensile modulus of at least 20 Msi and tensile strain at least about 1.7%.

67. (cancelled) A composite core as set forth in claim 64 wherein said outer core comprises a tensile strength at least 298,103 psi and a tensile modulus at least 11.2 x 10^6 psi.

68. (cancelled) A composite core as set forth in claim 64 wherein said outer core and said inner core form a uniform concentric hybridized core.

69. (cancelled) A composite core as set forth in claim 64 wherein said outer core and said inner core form a segmented concentric core.

70. (cancelled) A composite core as set forth in claim 64 wherein said outer core and said inner core have a total fiber volume fraction in the range of about 50 to about 57%.

71. (cancelled) A composite core as set forth in claim 64 wherein said outer core and said inner core have a total fiber/resin ratio in the range of 62 to 75% by weight.

72. (cancelled) A composite core as set forth in claim 64 wherein said core comprises a tensile strength in the range of about 160 to 240 Ksi, modulus of elasticity in the range of about 7 to 30 Msi, operating temperature in the range of about 90 to about 230 C and a thermal expansion coefficient in the range of about 0 to about 6 x 10^{-6} m/m/C.

73. (cancelled) A method of providing electrical power using an aluminum conductor composite core reinforced cable the steps comprising:

using a cable having a composite core comprising at least one longitudinally oriented and substantially continuous reinforced fiber types in a thermosetting resin matrix said core having at least 50% by fiber volume fraction and an operating capability in the range of about 90 to about 230 C surrounded by at least one layer of aluminum conductor surrounding the composite core; and

transmitting power across the composite cable.

74. (cancelled) A method as set forth in claim 72 wherein said cable replaces at least a portion of existing cable.

75. (cancelled) A method as set forth in claim 72 wherein the composite core comprises a fiber/resin ratio in the range of about 62 to about 75% by weight.

76. (cancelled) A method as set forth in claim 72 wherein said cable comprises tensile strength in the range of about 160 to 240 Ksi, modulus of elasticity in the range of about 7 to 30 Msi, operating temperature in the range of about 90 to about 230 C and a thermal expansion coefficient in the range of about 0 to about 6 x 10^{-6} m/m/C.

77. (cancelled) A method as set forth in claim 72 wherein said cable comprises an ambient temperature range of about –40C to about 90 C.

78. (cancelled) Method of processing a composite core comprising the steps of:

providing a predetermined number of fiber tows;

guiding the fiber tows through a wet-out tank filled with resin;

using a B-stage oven and a plurality of bushings spaced apart to shape and compress said fiber tows; and

curing the composite core member;

79. (cancelled) A method as set forth in claim 77 wherein said guide is a plate having a plurality of passageways wherein the orientation of passageways is determined by the desired cross section configuration of the composite core.

80. (cancelled) A method as set forth in claim 77 wherein the number and type of fiber tows is determined to meet physical characteristics in the end composite core including a tensile strength in the range of 160 to 240 Ksi, a modulus of elasticity in the range of about 7 to about 30 Msi, an operating temperature in the range of about 90 to about 230 C and a thermal expansion coefficient in the range of about 0 to about 6 x 10^{-6} m/m/C.

81. (cancelled) A method as set forth in claim 77 wherein the step of guiding the fiber tows through a wet-out tank filled with resin further comprises a pre-heating step prior to wet-out to evaporate moisture in the fiber tows.

82. (cancelled) A method as set forth in claim 77 wherein the wet out tank filled with resin comprises a device to aid in wetting the fibers.

83. (cancelled) A method as set forth in claim 77 wherein the wet out tank filled with resin comprises a series of wipers to remove excess resin from the fibers.

84. (cancelled) A method as set forth in claim 77 wherein the step of shaping and compressing the fiber tows further comprises:

guiding the fiber tows into a first B-stage temperature oven;

guiding the fiber tows into a second B-stage temperature oven comprising a series of bushings wherein each bushing in the series comprises a plurality of passageways;

guiding the fiber tows through the consecutive series of bushings and passageways; and

using the bushings to form the composite core.

85. (cancelled) A method as set forth in claim 77 wherein the size of at least a portion of the passageways diminishes with consecutive bushings.

86. (cancelled) A method as set forth in claim 77 wherein at least a portion of the position of the passageways changes with consecutive bushings.

87. (cancelled) A method as set forth in claim 77 wherein the first B-stage temperature oven is in the range of about 200 to about 250 F.

88. (cancelled) A method as set forth in claim 77 wherein the second B-stage temperature oven is in the range of about 200 to about 250 F.

89. (cancelled) A method as set forth in claim 77 wherein the step of curing the composite core further comprises:

guiding the composite core from the second B-stage temperature oven to a curing oven wherein the curing oven temperature is in the range of about 330 to about 370 F;

guiding the composite core from the curing oven to a cooling zone wherein the cooling zone is in the range of about 30 to about 100 F;

guiding the composite core from the cooling zone to a post-cure oven wherein the temperature of the post-cure oven is in the range of about 330 to about 370 F; and

guiding the composite core from the post-cure oven through a cooling zone wherein the core is cooled by air in the range of about 170 to about 180 F.

90. (cancelled) A method as set forth in claim 77 wherein the fibers of the composite core are selected from the group consisting of carbon, Kevlar, basalt, glass, aramid, boron, liquid crystal fibers, high performance polyethylene and carbon nanofibers.

91. (cancelled) A method as set forth in claim 77 wherein the method of processing comprises processing speeds in the range of about 9 ft/min to about 50 ft/min.

92. (cancelled) A method of improving the efficiency of an electrical power distribution system the steps comprising:

forming an aluminum conductor composite core reinforced cable comprising a composite core having at least one longitudinally oriented and substantially continuous reinforced fiber types in a thermosetting resin matrix said core having at least 50% fiber volume fraction and an operating capability in the range of about 90 to about 230 C surrounded by at least one layer of aluminum conductor; and

replacing at least a portion of existing distribution lines with said cable.

93. (cancelled) A method as set forth in claim 91 wherein said composite core comprises a fiber/resin ratio in the range of 62 to 75% by weight.

94. (cancelled) A method as set forth in claim 91 wherein said composite core comprises a fiber volume fraction in the range of about 50 to about 57%.

95. (cancelled) A method as set forth in claim 91 wherein said composite core comprises a hybridized concentric core having an inner carbon/epoxy layer and an outer glass fiber/epoxy layer.

96. (cancelled) A composite core for an aluminum conductor composite core reinforced cable comprising:

a segmented inner core comprising advanced composite; and

a segmented outer core comprising low modulus composite.

97. (cancelled) A composite core as set forth in claim 95 wherein the total fiber fraction is in the range of about 50 to about 57%.

98. (cancelled) A composite core as set forth in claim 95 wherein the total fiber/resin ratio is in the range of about 62 to 75% by weight.

99. (cancelled) A composite core as set forth in claim 95 wherein the core comprises a tensile strength in the range of about 160 to about 240 Ksi, modulus of elasticity in the

range of about 7 to about 30 Msi, operating temperature in the range of about 90 to about 230 C and a thermal expansion coefficient in the range of about 0 to about 6 x 106 m/m/C.

100. (cancelled) A composite core as set forth in claim 95 wherein the physical characteristics of said outer layer accommodates splicing.

101. (cancelled) A composite core as set forth in claim 95 wherein the segments are formed separately.

102. (cancelled) A composite core as set forth in claim 95 wherein said composite core comprises a segmented concentric core having an inner carbon/epoxy layer and an outer glass fiber/epoxy layer.

103. (new) A composite core for an electrical cable comprising:

an inner core consisting of advanced composite material comprising at least one longitudinally oriented and substantially continuous reinforced fiber type in a thermosetting resin; and

an outer core consisting of low modulus composite material comprising at least one longitudinally oriented and substantially continuous reinforced fiber type in a thermosetting resin;

wherein, said composite core comprises a core tensile strength of at least about 160 Ksi (1103 MPa).

104. (new) A composite core as claimed in claim 103 wherein, the reinforced fiber types of the composite core are selected from the group consisting of carbon, Kevlar, basalt, glass, aramid, boron, liquid crystal fibers, high performance polyethylene and carbon nanofibers.

105. (new) A composite core as claimed in claim 103 comprising a thermosetting resin having a neat resin fracture toughness at least about 0.87 INS-lb/in (0.96 $MPa \cdot m^{1/2}$).

106. (new) A composite core as claimed in claim 103 wherein, at least one reinforced fiber type in the inner core comprises a modulus of elasticity in the range of about 22 (151 GPa) to 37 Msi (255 GPa) coupled with a coefficient of thermal expansion in the range of about -0.7 to about 0 m/m/°C and a tensile strength of at least about 350 Ksi (2413 MPa) and at least one reinforced fiber type in the outer core comprises a tensile strength in the

range of at least about 180 Ksi (1241 MPa) coupled with a coefficient of thermal expansion in the range of about 5 x 10^{-6} to about 10 x 10^{-6} m/m/C.

107. (new) A composite core as claimed in claim 103 wherein, the composite material of the inner core and the outer core is selected to meet physical characteristics in the end composite core including a tensile strength of at least 160 Ksi (1103 MPa), a modulus of elasticity in the range of at least about 7 Msi (48 GPa) to about 30 Msi (206 GPa), an operating temperature in the range of about 90 to about 230 °C and a thermal expansion coefficient at least in the range of about 0 to about 6 x 10^{-6} m/m/°C.

108. (new) A composite core as claimed in claim 103 comprising a fiber/resin volume fraction in the range of at least about 50%.

109. (new) A composite core as claimed in claim 103 comprising a fiber/resin ratio of at least about 62% by weight.

110. (new) A composite core as claimed in claim 103 wherein, said composite core comprises a hybridized concentric core having an inner carbon fiber/thermosetting resin core and an outer glass fiber/thermosetting resin core.

111. (new) A composite core as claimed in claim 103 wherein, said inner and outer cores form a concentric hybridized core.

112. (new) A composite core as set forth in claim 103 wherein, said outer core and said inner core form a segmented concentric core.

113. (new) A composite core as claimed in claim 103 wherein, at least one layer of a plurality of aluminum segments is wrapped around the core.

114. (new) A composite core for an electrical cable comprising:

two or more types of reinforced fiber types in a thermosetting resin matrix, said core having at least 50% fiber volume fraction, wherein at least one fiber comprises a modulus of elasticity in the range of about 22 (151 GPa) to 37 Msi (255 GPa) coupled with a coefficient of thermal expansion in the range of about -0.7 to about 0 m/m/C and a tensile strength at least about 350 Ksi (2413 MPa) and at least one fiber comprises a coefficient of thermal expansion in the range of

about 5 x 10^{-6} m/m/C to about 10 x 10-6 m/m/C and a tensile strength of at least about 180 Ksi (1241 MPa).

115. (new) A composite core as claimed in claim 114 wherein, the reinforced fiber types of the composite core are selected from the group consisting of carbon, Kevlar, basalt, glass, aramid, boron, liquid crystal fibers, high performance polyethylene and carbon nanofibers.

116. (new) A composite core as claimed in claim 114 comprising a thermosetting resin having a neat resin fracture toughness at least about 0.87 INS-lb/in (0.96 $MPa \cdot m^{1/2}$).

117. (new) A composite core as claimed in claim 114 wherein, a proportion and type of fibers are selected to meet physical characteristics in the end composite core including a tensile strength in the range of at least 160 Ksi (1103 MPa), a modulus of elasticity in the range of at least about 7 (48 GPa) to about 30 Msi (206 GPa), an operating temperature in the range of about 90 to about 230 °C and a thermal expansion coefficient at least in the range of about 0 to about 6 x 10^{-6} m/m/°C.

118. (new) A composite core as claimed in claim 114 comprising a fiber/resin volume fraction in the range of at least about 50%.

119. (new) A composite core as claimed in claim 114 comprising a fiber resin ratio of at least about 62% by weight.

120. (new) A composite core as claimed in claim 114 wherein said composite core comprises a hybridized concentric core having an inner carbon/thermosetting resin layer and an outer glass fiber/thermosetting resin layer.

121. (new) A composite core as claimed in claim 114 wherein, the core comprises an outer layer and an inner layer that form a concentric hybridized core.

122. (new) A composite core as set forth in claim 114 wherein, the core comprises an outer layer and an inner layer that form a segmented concentric core.

123. (new) A composite core as claimed in claim 114 wherein, at least one layer of a plurality of aluminum segments is wrapped around the core.

124. (new) A composite core for an electrical cable comprising:

one or more types of longitudinally oriented and substantially continuous reinforced fiber types in a thermosetting resin matrix, said core having a tensile strength of at least about 160 Ksi (1103 MPa) and a modulus of elasticity in the range of about 7 to about 30 Msi.

125. (new) A composite core as claimed in claim 124 wherein, the reinforced fiber types of the composite core are selected from the group consisting of carbon, Kevlar, basalt, glass, aramid, boron, liquid crystal fibers, high performance polyethylene and carbon nanofibers.

126. (new) A composite core as claimed in claim 124 comprising a thermosetting resin having a neat resin fracture toughness at least about 0.87 INS-lb/in (0.96 $MPa \cdot m^{1/2}$).

127. (new) A composite core as claimed in claim 124 wherein, the composite core comprises two or more fiber types wherein, at least one reinforced fiber type comprises a modulus of elasticity in the range of about 22 (151 GPa) to 37 Msi (255 GPa) coupled with a coefficient of thermal expansion in the range of about -0.7 to about 0 m/m/C and a tensile strength in the range of at least about 350 Ksi (2413 MPa) and at least one reinforced fiber type comprises a tensile strength in the range of at least about 180 Ksi (1241 MPa) coupled with a coefficient of thermal expansion in the range of about 5×10^{-6} to about 10×10^{-6} m/m/C.

128. (new) A composite core as claimed in claim 124 comprising a fiber/resin volume fraction in the range of at least about 50%.

129. (new) A composite core as claimed in claim 124 comprising a fiber resin ratio of at least about 62% by weight.

130. (new) A composite core as claimed in claim 124 wherein said composite core comprises a hybridized concentric core having an inner carbon/thermosetting resin layer and an outer glass fiber/thermosetting resin layer.

131. (new) A composite core as claimed in claim 124 wherein, said composite core comprises an inner layer and an outer layer wherein, said layers form a concentric hybridized core.

132. (new) A composite core as set forth in claim 130 wherein, said composite core comprises an inner and an outer layer wherein, said layers form a segmented concentric core.

133. (new) A composite core as claimed in claim 124 wherein, at least one layer of a plurality of aluminum segments is wrapped around the core.

134. (new) A composite core for an electrical cable comprising a composite material, said core having a tensile strength of at least about 160 Ksi (1103 MPa) and an operating temperature of at least about 90 °C wherein, said core is sufficiently flexible to wind around at least a seven foot wheel diameter for transportation.

135. (new) A composite core as claimed in claim 134 wherein, the reinforced fiber types of the composite core are selected from the group consisting of carbon, Kevlar, basalt, glass, aramid, boron, liquid crystal fibers, high performance polyethylene and carbon nanofibers.

136. (new) A composite core as claimed in claim 134 comprising a thermosetting resin having a neat resin fracture toughness at least about 0.87 INS-lb/in (0.96 $MPa{\cdot}m^{1/2}$).

137. (new) A composite core as claimed in claim 134 wherein, said composite material further comprises at least one reinforced fiber type comprising a modulus of elasticity in the range of about 22 (151 GPa) to 37 Msi (255 GPa) coupled with a coefficient of thermal expansion in the range of about -0.7 to about 0 m/m/°C and a tensile strength in the range of at least about 350 Ksi (2413 MPa) and at least one reinforced fiber type comprising a tensile strength in the range of at least about 180 Ksi (1241 MPa) coupled with a coefficient of thermal expansion in the range of about 5×10^{-6} to about 10×10^{-6} m/m/°C.

138. (new) A composite core as claimed in claim 134 wherein, the composite material comprises a number and type of fibers selected to meet physical characteristics in the end composite core including a tensile strength in the range of at least 160 Ksi (1103 MPa), a modulus of elasticity in the range of at least about 7 (48) to about 30 Msi (206 GPa), an operating temperature in the range of about 90 to about 230 C and a thermal expansion coefficient at least in the range of about 0 to about 6×10^{-6} m/m/C.

139. (new) A composite core as claimed in claim 134 wherein, said composite core comprises a hybridized concentric core having an inner carbon/thermosetting resin layer and an outer glass fiber/thermosetting resin layer.

140. (new) A composite core as claimed in claim 134 wherein, said composite core comprises an inner layer and an outer layer wherein, said layers form a concentric hybridized core.

141. (new) A composite core as set forth in claim 134 wherein said composite core comprises an outer layer and an inner layer that form a segmented concentric core.

142. (new) A composite core as claimed in claim 134 wherein at least one layer of a plurality of aluminum segments is wrapped around the core.

143. (new) A composite core for an electrical cable comprising:

an inner core comprising a high grade carbon fiber comprising a tensile strength of at least 700 Ksi and a tensile modulus of at least 30 Msi in a thermosetting resin comprising a viscosity range of at least about 200 to about 1500 Centipoise at 20 °C; and

an outer core comprising an E-glass fiber in a thermosetting resin comprising a viscosity range of at least about 200 to about 1500 Centipoise at 20 °C;

wherein, the composite core comprises a tensile strength in the range of about 160 to 240 Ksi and a modulus of elasticity in the range of about 7 to about 30 Msi.

144. (new) A composite core as claimed in claim 143 wherein the inner core and the outer core comprise a number and type of fibers selected to meet physical characteristics in the end composite core including a tensile strength in the range of at least 160 Ksi (1103 MPa), a modulus of elasticity in the range of at least about 7 (48) to about 30 Msi (206 GPa), an operating temperature in the range of about 90 to about 230 °C and a thermal expansion coefficient at least in the range of about 0 to about 6×10^{-6} m/m/°C.

145. (new) A composite core as claimed in claim 143 wherein, said inner and outer cores form a concentric hybridized core.

146. (new) A composite core as set forth in claim 143 wherein, said outer core and said inner core form a segmented concentric core.

147. (new) A composite core as claimed in claim 143 wherein at least one layer of a plurality of aluminum segments is wrapped around the core.

148. (new) A composite core for an electrical cable comprising:

an inner core comprising a carbon fiber and at least a portion of one or more fibers having mechanical properties in excess of glass fiber in a thermosetting resin; and

an outer core comprising a glass fiber in a thermosetting resin.

149. (new) The composite core as claimed in claim 148, wherein the fiber having mechanical properties in excess of glass fiber is basalt.

150. (new) A composite core as claimed in claim 148 wherein, the inner and outer cores comprise a proportion and type of fibers selected to meet physical characteristics in the end composite core including a tensile strength in the range of at least 160 Ksi (1103 MPa), a modulus of elasticity in the range of at least about 7 (48 GPa) to about 30 Msi (206 GPa), an operating temperature in the range of about 90 to about 230 °C and a thermal expansion coefficient at least in the range of about 0 to about 6×10^{-6} m/m/°C.

151. (new) A composite core as claimed in claim 148 wherein, said inner and outer cores form a concentric hybridized core.

152. (new) A composite core as set forth in claim 148 wherein, said outer core and said inner core form a segmented concentric core.

153. (new) A composite core as claimed in claim 148 wherein, at least one layer of a plurality of aluminum segments is wrapped around the core.

154. (new) An electrical cable comprising:

a composite core further comprising:

an inner core consisting of advanced composite material comprising at least one longitudinally oriented and substantially continuous reinforced fiber type in a thermosetting resin;

an outer core consisting of low modulus composite material comprising at least one longitudinally oriented and substantially continuous reinforced fiber type in a thermosetting resin; and

at least one layer of conductor surrounding said outer core;

wherein, said composite core comprises a core tensile strength of at least about 160 Ksi (1103 MPa).

155. (new) An electrical cable as claimed in claim 154 wherein, the reinforced fiber types of the composite core are selected from the group consisting of carbon, Kevlar, basalt, glass, aramid, boron, liquid crystal fibers, high performance polyethylene and carbon nanofibers.

156. (new) An electrical cable as claimed in claim 154 wherein the composite core further comprises a thermosetting resin having a neat resin fracture toughness at least about 0.87 INS-lb/in (0.96 $MPa \cdot m^{1/2}$).

157. (new) An electrical cable as claimed in claim 154 wherein, the composite core comprises at least one reinforced fiber type in the inner core comprising a modulus of elasticity in the range of about 22 (151 GPa) to 37 Msi (255 GPa) coupled with a coefficient of thermal expansion in the range of about -0.7 to about 0 m/m/°C and a tensile strength of at least about 350 Ksi (2413 MPa) and at least one reinforced fiber type in the outer core comprising a tensile strength in the range of at least about 180 Ksi (1241 MPa) coupled with a coefficient of thermal expansion in the range of about 5×10^{-6} to about 10×10^{-6} m/m/C.

158. (new) An electrical cable as claimed in claim 154 wherein, the composite material of the inner core and the outer core is selected to meet physical characteristics in the end composite core including a tensile strength of at least 160 Ksi (1103 MPa), a modulus of elasticity in the range of at least about 7 Msi (48 GPa) to about 30 Msi (206 GPa), an operating temperature in the range of about 90 to about 230 °C and a thermal expansion coefficient at least in the range of about 0 to about 6×10^{-6} m/m/°C.

159. (new) An electrical cable as claimed in claim 154 wherein, the composite core comprises a fiber/resin volume fraction in the range of at least about 50%.

160. (new) An electrical cable as claimed in claim 154 wherein, the composite core comprises a fiber/resin ratio of at least about 62% by weight.

161. (new) An electrical cable as claimed in claim 154 wherein, said composite core comprises a hybridized concentric core having an inner carbon fiber/thermosetting resin core and an outer glass fiber/thermosetting resin core.

162. (new) An electrical cable as claimed in claim 154 wherein, said inner and outer cores form a concentric hybridized core.

163. (new) An electrical cable as set forth in claim 154 wherein, said outer core and said inner core form a segmented concentric core.

164. (new) A method of transmitting electrical power comprising:

using a cable comprising a composite core and at least one layer of aluminum conductor surrounding the composite core, the composite core further comprising:

an inner core consisting of advanced composite material comprising at least one longitudinally oriented and substantially continuous reinforced fiber type in a thermosetting resin; and

an outer core consisting of low modulus composite material comprising at least one longitudinally oriented and substantially continuous reinforced fiber type in a thermosetting resin;

wherein the composite core comprises a tensile strength in the range of at least about 160 Ksi (1103 MPa); and

transmitting power across the composite cable.

165. (new) Method of processing a composite core member comprising the steps of:

providing a predetermined number and type of fiber tows;

guiding the fiber tows through a wet-out process;

using a B-stage oven and a series of a plurality of bushings to shape and compress said fiber tows; and

curing the composite core member.

166. (new) A method as set forth in claim 164 wherein, using a B-stage oven and a series of a plurality of bushings to shape and compress said fiber tows further comprises using a

plurality of bushings having a plurality of passageways wherein, the orientation of passageways is determined by the desired cross section configuration of the composite core.

167. (new) A method as set forth in claim 164 wherein the number and type of fiber tows are selected to meet physical characteristics in the end composite core including a tensile strength of at least 160 Ksi (1103 MPa), a modulus of elasticity in the range of at least about 7 (48) to about 30 Msi (206 GPa), an operating temperature in the range of about 90 to about 230 °C and a thermal expansion coefficient in the range of about 0 to about 6 x 10^{-6} m/m/°C.

168. (new) A method as set forth in claim 164 wherein, the step of guiding the fiber tows through the wet-out process further comprises using a wet-out tank filled with resin and a pre-heating step prior to wet-out to evaporate moisture in the fiber tows.

169. (new) A method as set forth in claim 164 wherein, the wet-out process further comprises a tank filled with resin and a device to aid in wetting the fibers.

170. (new) A method as set forth in claim 164 wherein, the wet out tank filled with resin comprises a series of wipers to remove excess resin from the fibers.

171. (new) A method as set forth in claim 164 wherein, the step of using a B-stage oven and a series of a plurality of bushings to shape and compress said fiber tows further comprises using bushings having a plurality of passageways wherein, at least a portion of the passageways diminishes with consecutive bushings.

172. (new) A method as set forth in claim 164 wherein, the step of using a B-stage oven and a series of a plurality of bushings to shape and compress said fiber tows further comprises using bushings having a plurality of passageways wherein, at least a portion of the passageways diminishes with consecutive bushings and wherein, at least a portion of the position of the passageways changes with consecutive bushings.

173. (new) A method as set forth in claim 164 wherein the step of shaping and compressing the fiber tows further comprises:

guiding the fiber tows into a first B-stage temperature oven;

guiding the fiber tows into a second B-stage temperature oven comprising a series of bushings wherein each bushing in the series comprises a plurality of passageways;

guiding the fiber tows through the consecutive series of bushings and passageways; and

using the bushings to form the composite core.

174. (new) A method as set forth in claim 164 wherein the step of curing the composite core further comprises:

guiding the composite core through a second B-stage temperature oven to a curing oven wherein the curing oven temperature is in the range of about 330 (165) to about 370 F (188 C);

guiding the composite core from the curing oven to a cooling zone wherein the cooling zone is in the range of about 30 (-1) to about 100 F (37 C);

guiding the composite core from the cooling zone to a post-cure oven wherein the temperature of the post-cure oven is in the range of about 330 (165) to about 370 F (188 C); and

guiding the composite core from the post-cure oven through a cooling zone wherein the core is cooled by air in the range of about 170 (76) to about 180 F (82 C).

175. (new) A method as set forth in claim 164 wherein the step of using a B-stage oven and a series of a plurality of bushings to shape and compress the fiber tows further comprises forming one or more segments to make the composite core.

176. (new) A method as set forth in claim 164 wherein the step of guiding the fiber tows further comprises twisting the orientation of the fiber.